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MOUNTING UNIT FOR A WINDOW OR A DOOR

[0001] The present invention relates to a mounting unit for a window or a door, having a frame on which a leaf is held, the leaf being movable from a closed position by means of at least one curve guiding mechanism into a parallel knockout position, and the leaf being pivotable from the parallel knockout position about a vertical axis into a rotary opening position.

[0002] From German Patent Document DE 10113597, a mounting unit for a window or a door is known, in the case of which a leaf can first be moved into a knockout position in order to then be pivoted from this knockout position into a rotary opening position. For the parallel knockout of the leaf, connecting link guides are provided, while the pivoting takes place about a vertical axis which can be moved horizontally by the length of the knockout movement. This mounting unit has the disadvantage that, as a result of the fixed distance of the leaf from the axis of rotation at the frame, the leaf cannot be opened completely, that is, only at 90°. The opening angle can be slightly enlarged by corresponding contours of the frame and of the leaf which, however, does not reach the goal of the opening by 90° and additionally is visually disadvantageous.

[0003] Furthermore, it had been suggested in the prior art to, on the one hand, permit a knockout of a window and, on the other hand, permit a rotary opening only from the closed position. However, this construction is poorly suitable for an automatic opening operation because two possible types of movements are available which first require a selection.

[0004] A mounting for a tilting-pivoting leaf with a scissors-type knockout arrangement is also known from German Patent Document DE 1 086 147. By means of the mounting, the window can optionally be brought into a tilting or rotary opening position.

[0005] Furthermore, a parallel knockout window with a rotary function is known from German Patent Document DE 19825071, in which a mounting element reaches angularly around a frame, a connecting link guide for the parallel knockout of the window being provided at the mounting element itself. These mounting elements have the disadvantage that they are mounted on the frame from the outside and are therefore visually

conspicuous and, on the other hand, have to be guided through the sealing devices between the leaf and the frame. In addition, the mounting element itself acts as a cold bridge. This construction is therefore not suitable for high-quality doors or windows.

[0006] It is therefore an object of the present invention to provide a mounting unit for a window or a door which permits a parallel knockout and a pivoting into a rotary opening position with a large opening angle in a compact construction.

[0007] This object is achieved by means of a mounting unit having the characteristics of Claim 1.

[0008] According to the invention, a leaf is held on a frame, in which case, for guiding the leaf, at least one upper horizontal guiding mechanism is provided on a top side of the leaf and at least one lower horizontal guiding mechanism is provided on an underside of the leaf, which are arranged inside the frame in the closed position of the leaf. As a result, no mounting parts protrude beyond the leaf or the frame in the closed position, so that a good heat insulation and a compact construction are achieved. Furthermore, as a result of the horizontal guiding mechanisms, a stable guidance of the leaf is achieved which can be moved into a rotary opening position with a large opening angle. The term "pivoting" comprises any rotational movement, in which case additionally another relative movement of the leaf with respect to the axis of rotation may exist.

[0009] Preferably, the upper and the lower guiding mechanism are each linked to the frame about a vertical axis, so that the corresponding mounting parts can be mounted on an interior side of the frame. The upper guiding mechanism then extends at least partially along the top side of the leaf, and the lower guiding mechanism extends at least partially along the underside of the leaf, so that the guiding mechanisms are not visible in the closed position and appear only during the pushing-out and pivoting of the leaf.

[00010] According to a preferred embodiment, the vertical axis passes through a space between the frame and the leaf. It will then be advantageous for the leaf to move away relative to the vertical axis during the pivoting in the opening direction, so that, during the pivoting, the leaf does not strike against the frame and the maximal opening position is limited.

[00011] In order to move the leaf slightly away from the axis of rotation during the pivoting, an additional guiding mechanism can be guided on the frame at least on the upper side, which additional guiding mechanism is connected with the guiding mechanism in a hinged manner. The leaf can be at least partially held on the additional guiding mechanism, so that a defined pivoting movement takes place during the opening. In this

case, the additional guiding mechanism is guided with one end on the frame and is linked to the guiding mechanism on the opposite side, a linking of the guiding mechanism being provided between a fastening point for the leaf and the guidance in the frame. The distance between the linkage of the guiding mechanism and the fastening point for the leaf can be utilized for removing the lead during the pivoting in the opening direction from the axis of rotation of the guiding mechanism and thus achieving a larger maximal opening position than would be possible without a corresponding radial movement.

[00012] In order to avoid damage caused by an excessive opening of the leaf, an opening limit is preferably provided. As a result, the mounting unit is also particularly suitable for an automatic operation. The opening limit preferably has two arms which are hinged to one another and whose pivoting capacity relative to one another is limited by a stop. As a result, the opening limit can be mounted on a relatively small space. As an alternative, the displacement of an additional guiding mechanism can be selected as an opening limit, which would then require slightly more space.

[00013] According to another embodiment of the invention, a leaf lifter is mounted in the area of the axis of rotation of the lower guiding mechanism on the frame in order to introduce the weight of the leaf into the frame. For this purpose, the leaf lifter may have an angular construction and by means of a leg reach under the leaf, so that a particularly stable supporting takes place. A second leg can be fastened laterally to the leaf. In this case, a certain elasticity will then preferably exist so that the knockout movement of the leaf is compensated by a certain warping of the upper leg. In this case, the leaf lifter can also be slightly tipped laterally so that the leaf is always securely held even during an adjusting movement of the leaves.

[00014] Further, to obtain a particularly compact construction, corner deflections can be provided on the side of the leaf situated opposite the vertical axis, on which corner deflections one radial cam respectively is mounted for the parallel pushing-out of the leaf.

[00015] In the following, the invention will be explained in detail by means of several embodiments with reference to the attached drawings.

[00016] Figure 1 is a schematic front view of a mounting unit according to the invention in the mounted condition;

[00017] Figures 2A and 2B are two views of a curve guiding mechanism of the mounting unit;

[00018] Figure 3 is a top view of the upper area of the mounting unit about the vertical axis of rotation;

[00019] Figure 4 is a top view of the upper area of the mounting unit about the vertical axis of rotation according to another embodiment;

[00020] Figure 5A is a lateral view of the upper area of the mounting unit;

[00021] Figure 5B is a sectional view of the leaf and the frame;

[00022] Figure 6A is a top view of the upper area of the mounting unit of Figure 5A;

[00023] Figure 6B is a sectional view of the frame and the leaf;

[00024] Figure 7 is a top view of the mounting unit in the upper area of the axis of rotation similarly to Figure 6a, but in the knockout position;

[00025] Figure 8 is a top view of the mounting unit in the lower area adjacent to the axis of rotation;

[00026] Figure 9 is a top view of the upper area of the mounting unit adjacent to the axis of rotation in the opened position; and

[00027] Figure 10 is a front view of the mounting unit in the lower area adjacent to the axis of rotation in the closed position.

[00028] A mounting unit is mounted on a frame 1 and a leaf 2, the leaf 2 being movable from the frame first into a parallel moved-out position and then into a rotary opening position. For this purpose, the leaf 2 can be pivoted about a vertical axis 3.

[00029] A handle 5, which moves a connecting rod mounting 6 by way of a gearing 4, is provided for moving the leaf 2. The connecting rod mounting 6 is connected with an upper and a lower curve guiding mechanism 8 by way of corner deflections 7. Adjacent to the curve guiding mechanism 8, another connecting rod mounting 9 is provided which is connected with a curve guiding mechanism 10 in order to ensure a parallel pushing-out of the leaf 2 also in the area of the axis 3 of rotation.

[00030] In the closed position of the leaf 2, the handle 5 is oriented downward. The maximal parallel knockout position of the leaf 2 is reached during the pivoting by way of the horizontal position into the diagonal position just before the perpendicular position in the upward direction. If the handle 5 is rotated still farther into the upward-oriented position, the leaf 2 is released at the curve guiding mechanisms 8 and can thus be pivoted about the vertical axis 3. For this purpose, an upper knockout device 11 and a lower knockout device 12 are provided which will be explained in detail in the following.

[00031] Figures 2A and 2B show a curve guiding mechanism 8. The curve guiding mechanism 8 comprises a basic body 13 in which a groove-shaped radial cam 14 is

recessed. The basic body 13 is fastened to the leaf 2 by way of screws 15 and is mounted on a connecting rod mounting 9 or on the corner deflection 7. A pin 16 is fastened on the frame 1. It is also conceivable to connect the pin 16 with the connecting rod mounting 9 or the corner deflection 7 of the leaf 2 and to mount the basic body 13 on the frame 1.

[00032] The pin 16 moves in the radial cam 14 and is arranged in the lower position when the leaf 2 is closed. When the pin is moved into position 16', the leaf 2 is in the maximally pushed-out position. In this position, the pin 16' is arranged at a mouth 17 and can leave the curve guiding mechanism 8. In position 16", the pin is situated outside the basic body 13, and the leaf 2 is in a rotary opening position.

[00033] Figure 3 is a top view of the part of the mounting unit contained in Figure 1 at the top right. For guiding the leaf 2, a guiding mechanism 20 is provided which can be rotated about the vertical axis 3. For a better overview, the frame is illustrated to be slightly removed from the leaf 2. In reality, a web 18 rests on the leaf 2 and, on the opposite interior side, a sealing device 19 on the leaf 2 rests on the frame 1. On the opposite side, the guiding mechanism 20 is connected by way of an oblong hole with a bolt 25 which is disposed in a housing 50 illustrated in Figure 9. The housing 50 itself is anchored in a positionally fixed manner in the mounting receiving groove 2 of the leaf 2.

[00034] An auxiliary guiding mechanism 24 is mounted on the guiding mechanism 20 and, at an axis 27, is hinged to an additional guiding mechanism 21 and, at an axis 26, to the guiding mechanism 20. The additionally guiding mechanism 21 is also linked with an axis 28 to the housing 50 and, above it, is connected with the leaf 2. On the opposite side, a slide 22 is provided on the additional guiding mechanism 21, which slide 22 is movably disposed in a groove 23 on the frame 1.

[00035] For a parallel moving-out of the leaf 2, the leaf 2 is lifted off the frame 1 by way of the curve guiding mechanisms of the leaves 2, so that the leaf 2 reaches position 2'. In this position, the guiding mechanism is in position 20' and the additional guiding mechanism is in position 21'. The leaf 2' is held on the axis 28 by means of the curve guiding mechanism 10 as well as by means of fastening devices. During the movement from the closed position into the opened pivoting position 2", the leaf moves away relative to the axis 3 of rotation. The reason is that the leaf 2 is not mounted directly on the guiding mechanism 20 but on the axis 28 of the additional guiding mechanism 21.

[00036] In the closed position, the distance A exists between the axis 28 and the axis 3 of rotation, the distance between axis 27 and axis 28 amounting to a. In the opened position, the axis 27" is situated closer to the axis 3 of rotation than the axis 28", the radial distance

between the axes 27" and 28" amounting to b. The distance between the axis 3 of rotation and the axis 28" was marked B. The following geometrical relationship is obtained on the basis of the linkage of the guiding mechanisms:

$$B = A + a + b$$

[00037] In other words, during the pivoting, the leaf 2 is moved by the length a + b farther away from the axis 3 of rotation, so that it is prevented that the leaf rests by means of the sealing device 19 or a corresponding contact edge against the frame 1 and the maximal opening position is limited. In the illustrated embodiment, the maximal opening position is reached when, in position 22", the slide 22 rests against a stop and therefore no further pivoting movement of the leaf 2 can be carried out.

[00038] In the alternative embodiment illustrated in Figure 4 for an upper knockout device in the area of the axis 3 of rotation, an auxiliary guiding mechanism 24, as shown in Figure 3, was omitted, whereby a certain simplification is achieved. A guiding mechanism 20 is disposed on an axis 3 of rotation fixed to the frame and is connected with an additional guiding mechanism 21 by way of an axis 29. The additional guiding mechanism 21 is situated above a slide 22 which is held in a groove 23 on the frame 1. Furthermore, an axis 28 is provided on the additional guiding mechanism 21, on which axis the leaf 2 is disposed by way of the housing 50. In addition, the leaf is also disposed on a curve guiding mechanism, which is not shown in detail, on the guiding mechanism 20.

[00039] For an opening of the leaf 2, the latter is first moved into the parallel pushed-out position 2'. Subsequently, the leaf 2 is opened and pivoted into position 2", the slide 22 being moved into the opening position 22" to a stop. The additional guiding mechanism 21" then projects diagonally and holds the leaf 2" on the axis 28".

[00040] Figure 5A shows the knockout device according to Figure 4, but viewed onto the plane of the leaf 2. The guiding mechanism 20 is fastened to the axis 3 of rotation and is connected with an additional guiding mechanism 30 by way of the axis 28, which additional guiding mechanism 30 is used as a pivot limiting device. The leaf 2 is held on the additional guiding mechanism 30 on an axis 29. Furthermore, a pin 91 is provided on the guiding mechanism 20, which pin 91 engages in a radial cam 90 of a curve guiding mechanism 10 which is displaceably disposed on the leaf 2. In contrast to the curve guiding mechanism (Fig. 2A) arranged on the side of the handle 5, however, the radial cam 90 has a closed design and only permits the pin 91 to carry out a sliding motion. The shape of the radial cam 90 is illustrated particularly in Figure 6A.

[00041] Figure 7 shows the upper part of the mounting unit similar to Figure 6A but in the maximally parallel moved-out position of the leaf 2. The pin 91 has moved in the radial cam 90, so that the leaf 2 has moved correspondingly. For reasons of clarity, the connecting rod 9 is illustrated at a distance from the curve guiding mechanism 10.

[00042] Figure 8 shows the knockout device 12 in the lower area of the leaf 2. The curve guiding mechanism 10 was moved by way of the stationary control pin 91 and thereby caused the parallel pushing-out of the leaf 2.

[00043] Figure 9 shows the leaf 2 in the opened position. In this case, the illustrated knockout device is arranged at the top on the leaf 2 but, in the same manner, can also be mounted on the bottom side. The guiding mechanism 20" is connected by way of the axis 29" with an additional guiding mechanism 30 which also has the effect of a limit for the pivoting-out motion. For this purpose, the additional guiding mechanism has a two-part construction with a first lever 31 and a second lever 32 which are mutually connected by way of an axis 33, the pin 33 being held in an oblong hole 34 of the lever 31. The lever 31 is rotatably fixed on a pin 36 on the frame. On the lever 32, the guiding mechanism 20" is fixed to the pin 29", while the leaf is held on a pin 28".

[00044] The opening position of the leaf 2 is limited in that a stop 35 is molded to the lever 31, which stop 35 permits a maximal angle of the levers 31 and 32 of less than 180°. As a result, the leaf 2 cannot jam even in the automatic operation. For closing the leaf 2, the two levers 31 and 32 are folded over one another, so that the space requirement for the additional guiding mechanism 30 and the limit for the pivoting-out motion is kept comparatively low.

[00045] Figure 10 illustrates the lower knockout device in a view onto the plane of the leaf 2. In the area of the axis 3 of rotation, a leaf lifter is provided which, by means of a first horizontal leg 41, reaches under the leaf 2 and, by means of a second leg 42, is laterally fixed to the leaf 2. The horizontal leg 41 corresponds to the guiding mechanism 20. For this purpose, the upper leg 42 is fastened by way of a pin 43 to an adjusting mounting 44 on the leaf 2.

[00046] The leaf lifter is fastened on the frame 1 by way of a pin 40 which forms the axis 3 of rotation. In the area of the axis 3 rotation 3, a bearing disk 45 is provided below the leaf lifter, so that the weight of the leaf 2 can be carried off to the frame 1.

[00047] The leaf lifter has no pivot about a horizontal axis but, as a result of the lower leg 41, which also acts as a guiding mechanism, a warping of the leg 41 takes place there which is supported on the bearing disk 45 by means of its edges during the parallel

moving-out of the leaf 2 and in the process compensates the measurement component which is the result of the tilting of the leaf lifter during the parallel moving-out. In addition, starting from the adjusting mounting 44, the leaf lifter is shaped and constructed diagonally downward to the frame 1 in order to introduce the weight of the leaf into the frame corner. The length of the leaf lifter is selected to be relatively large because this leaf lifter has to compensate the lifting-off movement of the leaf 2 from the frame 1 during the rotary opening by deformation.

[00048] In the preceding embodiments, a guiding mechanism 20 was illustrated in each case at which at least one additional guiding mechanism is mounted, in order to dispose the leaf 2 on the additional guiding mechanism and thereby achieve a relative movement away from the axis 3 of rotation of the guiding mechanism 20 during the pivoting of the leaf 2 out of the pushed-out position. This mechanism is stable and can easily be placed in the space between the leaf and the frame, so that it is not visible from the outside. However, it is also conceivable that, instead of the illustrated mechanisms, other mechanism can be used which permit a pivoting of the leaf from the pushed-out position.